

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
8 April 2004 (08.04.2004)

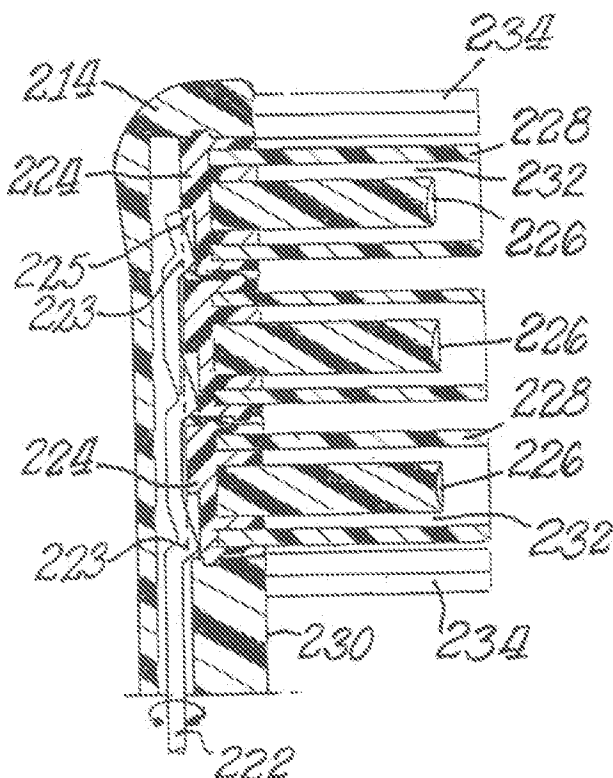
PCT

(18) International Publication Number  
WO 2004/028235 A2

- (51) International Patent Classification: Not classified
- (72) Inventor; and  
(73) Inventor/Applicant (for US only): HOHLBEIN, Douglas, J. (US/US); 45 Diverdy Road, Peabody, MA 01854 (US).
- (21) International Application Number:  
PCT/US2003/030633
- (74) Agent: GOLDFINE, Henry, S.; Colgate-Palmolive Company, 969 River Road, P.O. Box 1343, Piscataway, NJ 08855-1343 (US).
- (22) International Filing Date:  
25 September 2003 (26.09.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
60/414,117 27 September 2002 (27.09.2002) US  
60/418,776 16 October 2002 (16.10.2002) US  
60/419,425 18 October 2002 (18.10.2002) US
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GR, GU, HK, HN, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MY, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (71) Applicant (for all designated States except US): COLGATE-PALMOLIVE COMPANY (US/US); 300 Park Avenue, New York, NY 10022 (US).
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW).

[Continued on next page]

(54) Title: TOOTHBRUSH



(57) Abstract: A toothbrush includes a head having a prophylaxis polishing cup closely surrounded by cleaning elements in the form of a bristle ring extending above the upper surface of the cup. Alternatively, the cups could be in the form of arrays of densely packed cleaning elements. The area formed by these configurations retains toothpaste on the toothbrush during use. Additional cleaning elements may be arranged about the periphery of the toothbrush head. The toothbrush may be a powered toothbrush wherein the cups and/or bristle rings rotate, oscillate or reciprocate to better clean teeth.

are typically made of a soft elastomeric material and, as the name implies, are cup-shaped. The inner surface of the cup can contain ridges which help to clean teeth when the toothbrush is pressed against the user's teeth. More importantly, the cup shape of prophy cups 16 acts to hold toothpaste in place while the toothbrush 10 is in use.

Complementing this function of toothpaste retention is a set of cleaning elements or bristle rings 18 surrounding some or all of the prophy cups 16. As best illustrated in Figure 2, the bristle rings 18 extend a greater distance above the face 20 of head 14 than the prophy cups 16. This extra height relative to cups 16 acts as a further means for retaining toothpaste within the toothbrush head 14 during use. A preferred placement of the bristle rings 18 is with a space of about one (1) millimeter from the outer circumference of the prophy cup 16.

Upon the user's application of force on the handle 14 as the toothbrush 10 approaches the user's teeth, the toothpaste applied by the user will be forced into the holding areas 22 formed by between a prophy cup 16 and the surrounding bristle ring 18. The toothpaste will be held in holding areas 22 near the top of the bristle rings by the top of prophy cup 16.

This unique combination of prophy cups 16 and closely surrounding bristle rings 18 holds most of the toothpaste exactly where desired, namely, in the area 22 where the principal cleansing components, prophy cup and bristle rings, are in contact with the user's teeth. The

surrounding ring of bristles 18 captures the toothpaste as it escapes from the cup 16, to act as a replenishing reservoir when one changes the direction of one's brush stroke.

To complement the cleaning effect of the prophylactic cups 16 and bristle rings 18, additional elements 24 can be arranged about the periphery of head 14 in a manner similar to that shown in Figures 1 and 2. These peripheral cleaning elements 24 help to clean deep between teeth and along the gumline. These additional cleaning elements may be tufts of bristles and may be elastomeric walls or fingers, as illustrated.

Cleaning elements 24 and bristle rings 18 are arranged in both portions of head 14 in a known manner. For example, anchor free tufting (AFT) could be used to mount the cleaning elements. In AFT a plate or membrane is secured to the brush head such as by ultrasonic welding. The bristles extend through the plate or membrane. The free ends of the bristles on one side of the plate or membrane perform the cleaning function. The ends of the bristles on the other side of the plate or membrane are melted together by heat to be anchored in place. Any suitable form of cleaning elements may be used in the broad practice of this invention. The term "cleaning elements" is intended to be used in a generic sense which could include conventional fiber bristles or massage elements or other forms of cleaning elements such as elastomeric fingers or walls arranged in a circular cross-section shape or any type of desired shape including straight portions or sinusoidal portions. Where

bristles are used, the bristles could be mounted to tuft blocks or sections by extending through suitable openings in the tuft blocks so that the base of the bristles is mounted within or below the tuft block.

5           It is to be understood that the specific illustration of the cleaning elements is merely for exemplary purposes. The invention can be practiced with various combinations (such as APT, etc.) and/or with the same bristle or cleaning element materials (such as nylon bristles, spiral  
10 bristles, rubber bristles, etc.) Similarly, while the Figures illustrate the cleaning elements to be generally perpendicular to head 14, some or all of the cleaning elements may be angled at various angles with respect to the face 20 of head 14. It is thereby possible to select the combination  
15 of cleaning element configurations, materials and orientations to achieve specific intended results to deliver additional oral health benefits, like enhanced cleaning, tooth polishing, tooth whitening and/or massaging of the gums.

20           Although the bristle ring 18 is illustrated as being formed by fibrous bristles, the bristle ring could be formed by other types of cleaning elements such as elastomer fingers.

          Figure 3 illustrates a powered version 10A of  
25 the toothbrush wherein sections 40 of the head 14 are moved under power or may contain a powered set of cleaning elements. Sections 40 may take the form of circular discs. Preferably, the prophy cups 16 and/or bris-

the rings 18 would be mounted to the section 40 to be powered to provide rotational or oscillating movement thereto. Switch 26 on toothbrush 10A can be used to activate and deactivate power to the movable elements of  
5 toothbrush 10A.

The movable section 40 could be oscillated rotationally such as by using the type of drive mechanism shown in U.S. Patent No. 5,625,916, or could move in and out using the type of drive mechanism shown in U.S. Patent No. RE 35,941; all of the details of both patents  
10 are incorporated herein by reference thereto. Alternatively, the other types of drives referred to above could move section 40 in other manners and directions. Although Figure 3 shows movable section 40 to be at one  
15 end of the head 14, the movable section(s) would be located at any desired location on the head.

Figures 1-3 relate to the practice of the invention wherein the cleaning elements 18 surround prophylactic cups 16. The invention could, however, be practiced  
20 where instead of prophylactic cups the cups are formed by a dense pack of cleaning elements. This embodiment of the invention is illustrated in Figures 4-6. As shown therein the toothbrush 110 has many of the same features as the toothbrush 10. Thus, the toothbrush 110 includes  
25 a handle 112 and a head 114 similar to the same components in Figures 1-3.

In accordance with the practice of the invention shown in Figure 4-6, a central, dense pack of

cleaning elements 116 is arrayed in the center of head 114, preferable aligned with the longitudinal axis of toothbrush 110. As illustrated, three circular groups of densely packed cleaning elements 116 are affixed to head 114, although use of a larger or smaller number of such groups is contemplated for use with toothbrush 110. The ends of cleaning element groups 116 are typically contoured in cross-section to provide a cup-like shape. The cup-like shape of cleaning elements 116 acts to hold toothpaste in place while the toothbrush 110 is in use.

Complementing this function of toothpaste retention is a set of cleaning elements or bristle rings 118 surrounding some or all of the cup-shaped cleaning elements 116. As best illustrated in Figure 5, the bristle rings 118 extend a greater distance above the face 120 of head 114 than the cup-shaped elements 116. This extra height relative to cup-shaped cleaning elements 116 acts as a further means for retaining toothpaste within the toothbrush head 114 during use. A preferred placement of the bristle rings 118 is with a space of about one (1) millimeter from the outer circumference of the cup-shaped elements 116.

Upon the user's application of force on the handle 114 as the toothbrush 110 approaches the user's teeth, the toothpaste applied by the user will be forced into the holding areas 122 formed by the surrounding bristle rings 118. The toothpaste will be held in holding areas

122 near the top of the bristle rings by the top of cup-shaped elements 116.

This unique combination of elements 116 and closely surrounding bristle rings 118 holds most of the toothpaste exactly where desired, namely, in the area 122 adjacent where the principal cleansing components, which are in contact with the user's teeth. The surrounding ring of bristles 118 captures the toothpaste as it escapes from the cup-shaped bristles 116, to act as a replenishing reservoir when one changes the direction of one's brush stroke.

To complement the cleaning effect of the cup-shaped elements 116 and bristle rings 118, additional elements 124 can be arranged about the periphery of head 114 in a manner similar to that shown in Figures 4 and 5. These peripheral cleaning elements 124 help to clean deep between teeth and along the gumline.

As with toothbrush 10 of Figures 1-2, cleaning elements 116, 118, and 124 are arranged in head 114 in a known manner. Any suitable form of cleaning elements may be used in the broad practice of this invention.

Figure 6 illustrates a powered version 110A of the toothbrush wherein portions 140 of the head 114 are moved under power or may contain a powered set of cleaning elements. Preferably, the cup-shaped cleaning elements 116 and/or bristle rings 118 would be powered to provide rotational or oscillating movement thereto. A switch 126 on toothbrush 110A can be used to activate

## WHAT IS CLAIMED IS:

1. A toothbrush comprising a handle, a head attached to the handle, the head having a face on which is located at least one outwardly extending cup, and the cup being closely surrounded by cleaning elements in the form of a bristle ring extending a distance above the face of the head greater than the height of the cup to retain toothpaste in the area adjacent the cup and the bristle ring when the toothbrush is in use.
2. The toothbrush of claim 1, wherein additional cleaning elements are arranged about at least part of the periphery of the toothbrush head.
3. The toothbrush of claim 1 wherein the bristle ring completely surrounds the cup.
4. The toothbrush of claim 3 wherein the inner circumference of the bristle ring is located about 1 millimeter from the outer circumference of the cup.
5. The toothbrush of claim 3 wherein there are a plurality of sets of cups and bristle rings.
6. The toothbrush of claim 5 wherein the plurality of sets are uniformly spaced and longitudinally aligned along the longitudinal axis of the head.
7. The toothbrush of claim 1 wherein there are a plurality of sets of cups and bristle rings.
8. The toothbrush of claim 1 wherein the plurality of sets are uniformly spaced and longitudinally aligned along the longitudinal axis of the head.



Fig. 1.

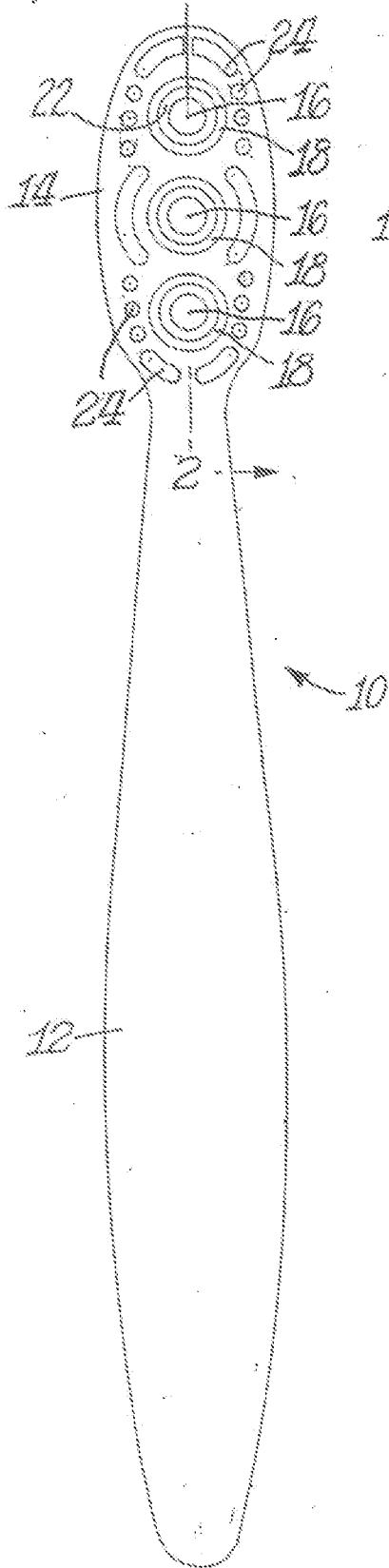


Fig. 2.

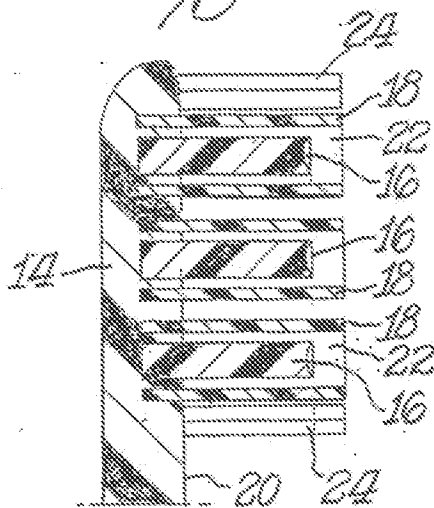
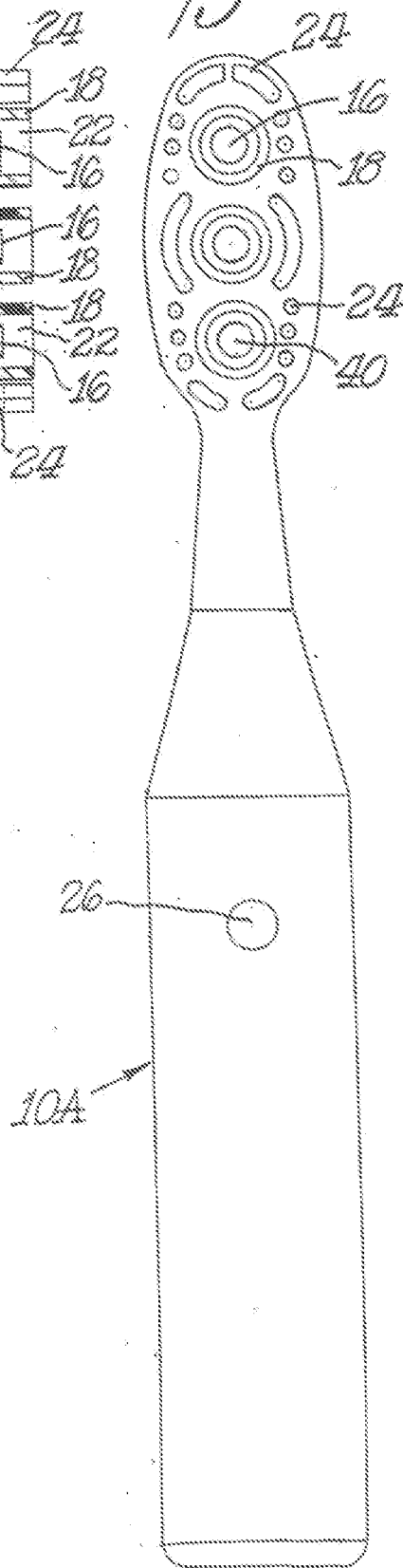
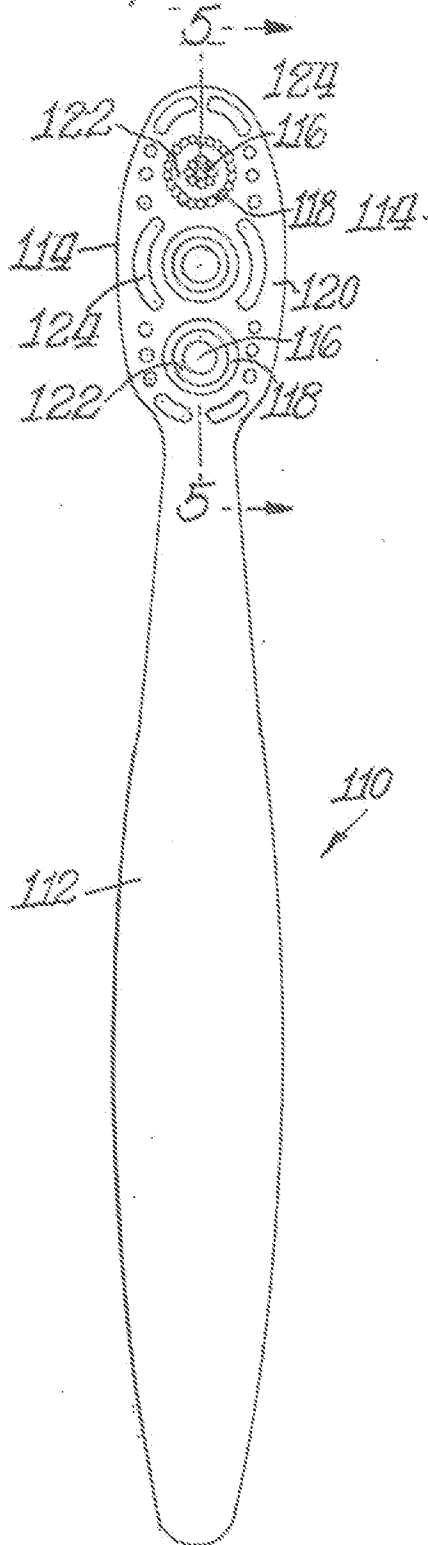


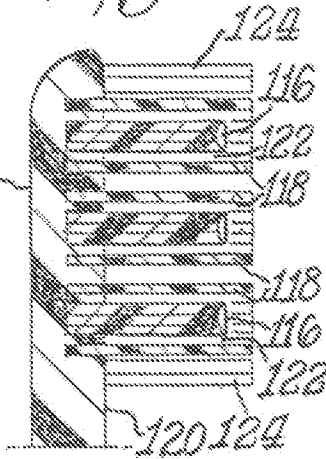
Fig. 3.



*Fig. 4.*



*Fig. 5.*



*Fig. 6.*

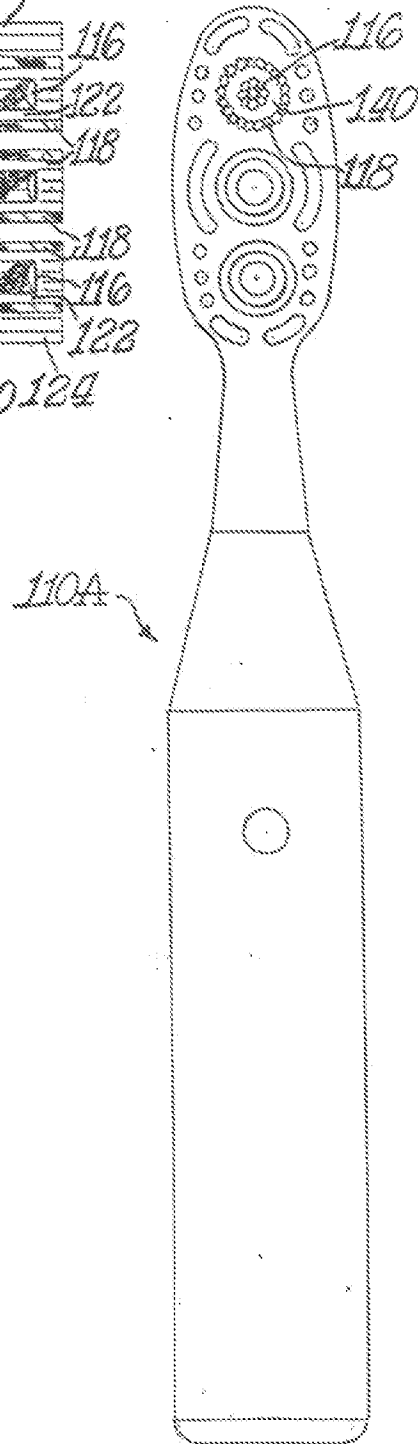


Fig. 7.

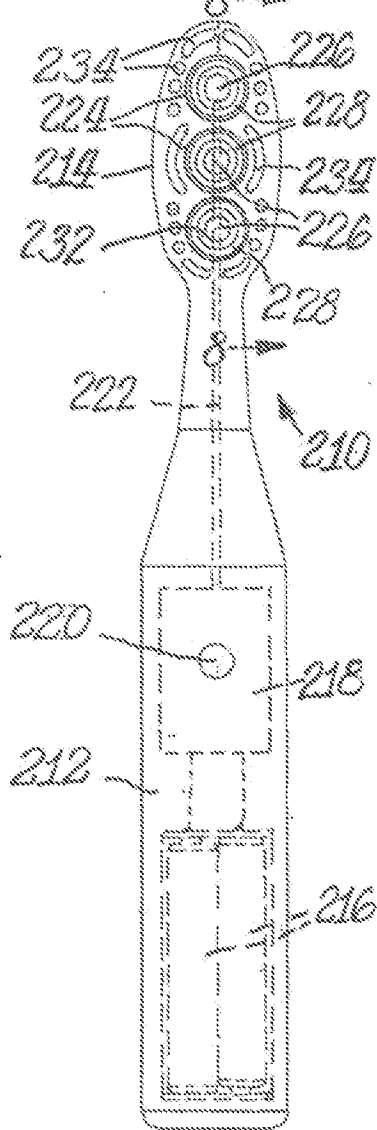


Fig. 8.

